Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (currently amended) A method of rapid identification of characteristics of a transmission media channel, comprising:

generating training signal sequence of time domain signals $\underline{x = [x_0, x_1, \ldots, x_{T-1}]}$ of length T;

transmitting the training signal sequence as an input to the transmission media channel, the transmission media channel having an unknown impulse response $h_{(n)}$, for n=0 to n=N-1, where N is the number of coefficients of the unknown impulse response;

obtaining an output signal sequence $\underline{(y_k)}$ of the transmission media channel $\underline{\text{for k=0 to k= T-(N-1)}}$ ~~represented approximated~~ by

$$y_k = \sum h_n x_{k+n} \hat{} \; \underline{+ g_k} \; \sout{+ g_k \text{ for k=0 to k= T-(N-1)};}$$

computing a reference value from the training signal sequence; and

using the reference value to operate on the output signal sequence for decoupling the training signal sequence from the output signal sequence for computing an estimate of the impulse response $h_{(n)}$ of the transmission media channel.

2. (previously presented) The method of claim 1, further comprising using the estimate of the impulse response of the transmission media channel to remove impairments imposed by the transmission media channel on received signals.

3. (cancelled)

4. (previously presented) The method of claim 1, wherein the training signal sequence comprises a known training signal sequence.

41. (original) The system of claim 39, wherein the processor comprises a CPU of a computer.

42. (original) The system of claim 39, further comprising a modem coupling the processor to the transmission media channel.

43. (currently amended) The system of claim 39, wherein the processor forms part of a ~~the~~ communications system.

44. (original) The system of claim 39, wherein the processor forms part of a modem.

45. (original) The system of claim 39, further comprising a hybrid coupling the processor to the transmission media channel.

46. (cancelled)

47. (currently amended) The ~~method~~ System of claim 39, wherein the ~~estimate of the~~ estimated impulse response of the transmission media channel is computed in a hardware implementation.

48. (currently amended) The ~~method~~ System of claim 39, wherein the ~~estimate of the~~ estimated impulse response of the transmission media channel is computed in a software implementation.

49. (currently amended) The system of claim 39, wherein the processor is adapted to use the ~~estimate of the~~ estimated impulse response of the transmission media channel to remove impairments imposed by the transmission media channel on received signals.

50. (currently amended) The system of claim 39, further comprising a filter adapted to remove transmission media channel impairments from signals received from the transmission media channel using the ~~estimate of the~~ estimated impulse response of the transmission media channel.

36. (currently amended) The system of claim 26, further comprising a filter adapted to remove transmission media channel impairments from signals received from the transmission media channel using the ~~estimate of the~~ estimated impulse response of the transmission media channel.

37. (previously presented) The system of claim 36, wherein the filter comprises an echo canceller for removing echo signals.

38. (previously presented) The system of claim 36, wherein the filter comprises an equalizer whose output is equalized for gain and phase.

39. (currently amended) A system for rapid identification of characteristics of a transmission media channel, comprising:

a processor for executing code for generating a known training signal sequence, the known training signal sequence transmitted as an input to the transmission media channel;

a communications system coupling the processor to the transmission media channel, the processor executing the code to:

obtain an observed or measured output signal of the transmission media channel related to the transmitted training signal sequence and an unknown impulse response of the transmission media channel,

compute from the training signal sequence, a reference value matrix $M = (\bar{X}X)^{-1}\bar{X}$, off-line from the transmission media channel, wherein X is the known training signal sequence, and $\bar{X}$ is the Hermitian of X,

decouple the training signal sequence from the observed or measured output signal ~~[[the-]]~~ of the transmission media channel, represented as a vector Y, and

compute an ~~estimate of the~~ estimated impulse response H of the transmission media channel expressed as $H = MY$; and

a disk storage medium for providing the code to the processor.

40. (original) The system of claim 39, wherein the processor comprises a DSP.